

REMARKS

Claims 1, 11, and 18 are amended; and claims 5 and 13 are canceled, without prejudice or disclaimer. Claims 1-3, 7-12, and 14-22 are pending.

The independent claims 1, 11, and 18 are amended to clarify that the electric wire of the present invention includes a copper core, with the outer layer of the copper core being covered in a layer of alloy consisting of tin, antimony and copper through dipping in a bath of molten alloy consisting of tin, antimony and copper. Such amendments are supported in the application as originally filed, for example, in paragraph [0010] of the corresponding published application.

In the office action, claims 1-3, 5, and 7-22 were rejected under 35 U.S.C. § 103(a) in view of U.S. Patent Publication Number US2002/0144910 to Takeshita et al. and U.S. Patent Number 2,744,063 to Shockley.

Independent claims 1, 11, and 18 are amended to recite and clarify that the present invention involves a wire and a method of making such a wire including a core composed of copper and having a cylindrical wire shape and able to continually conduct a current longitudinally along the length of the cylindrical wire shape, with the outer surface of the copper core being covered in a layer of alloy consisting of tin, antimony and copper through dipping in a bath of molten alloy consisting of tin, antimony and copper.

Pending claims 1-3, 7-12, and 14-22 are patentable over Takeshita and Shockley, since Takeshita and Shockley lack all of the elements, steps, and features of the present invention, and one having ordinary skill in the art would not look to Takeshita or Shockley for the present invention to overcome known technical problems solved by the present invention and concerning the improvement of audio and video electrical signals conduction in terms of higher quality and lower distortion.

Each of the pending claims 1-3, 7-12, and 14-22 recites a layer of alloy consisting of tin, antimony and copper, and formed on the outer surface of a copper core through dipping in a bath of molten alloy consisting of tin, antimony and copper.

Takeshita lacks a layer of alloy consisting of tin, antimony and copper, since Takeshita does not disclose or suggest the use of antimony or copper in the layer of alloy covering the copper core, as in the present invention.

In addition, Takeshita specifically requires that the alloy layer covering its conducting core includes gallium, in which the composition of the plating is comprised of 30 to 500 wppm gallium, and tin or tin alloy that makes up the remainder thereof. With the content of gallium being more than 30 wppm, thermal yellowing is able to be prevented which is the scope of Takeshita reference, as described in Takeshita, page 1, paragraph [0018] and the abstract of Takeshita.

It is well known that the term “consisting of” in claims is limited to the specific recitation of the recited elements. As per M.P.E.P. § 2111.03,

“The transitional phrase ‘consisting of’ excludes any element, step, or ingredient not specified in the claim. In re Gray, 53 F.2d 520, 11 USPQ 255 (CCPA 1931); Ex parte Davis, 80 USPQ 448, 450 (Bd. App. 1948) (‘consisting of’ defined as ‘closing the claim to the inclusion of materials other than those recited except for impurities ordinarily associated therewith.’) ... When the phrase ‘consists of’ appears in a clause of the body of a claim, rather than immediately following the preamble, it limits only the element set forth in that clause; other elements are not excluded from the claim as a whole. Mannesmann Demag Corp. v. Engineered Metal Products Co., 793 F.2d 1279, 230 USPQ 45 (Fed. Cir. 1986)” (emphasis added).

The “consisting of” clause in the pending claims is not in the preamble, but instead is directed to the composition of the core-covering outer layer, and so the “consisting of” clause “limits only the element set forth in that clause” as stated in M.P.E.P. § 2111.03.

Therefore, the present invention has a copper-core-covering outer layer which is limited to tin, antimony, and copper, and cannot include gallium, as recited in Takeshita.

In addition, one having ordinary skill in the art would recognize that the recitation and specific requirement of between 30 to 500 wppm gallium in Takeshita do not constitute impurities in the outer layer, but instead that such levels of gallium are high enough in order to prevent thermal yellowing, as recited in the abstract of Takeshita.

Accordingly, Takeshita teaches away from a copper-core-covering alloy which is limited to tin, antimony, and copper, as in the present invention, since Takeshita not only includes gallium of sufficiently high levels to not be considered impurities in the tin alloy, but Takeshita also requires the presence of gallium in the copper-core-covering alloy, specifically to prevent thermal yellowing, as recited in the abstract of Takeshita.

Furthermore, one having ordinary skill in the art would recognize that gallium as in the Takeshita alloy is not an equivalent chemical substitute to either antimony or copper in the copper-core-covering alloy of the present invention, since gallium is in Group 13 of the periodic table, while antimony is in Group 15, and copper is in Group 11, and so the chemical characteristics of gallium combined with tin in the alloy layer of Takeshita would be different and distinct from the chemical characteristics of the alloy layer of antimony and copper combined with tin as in the present invention.

In addition, although the “tin alloy” recited in Takeshita may include antimony or copper, as in the present invention, one skilled in the art would not look to Takeshita for an alloy of tin which also include both copper and antimony, since Takeshita does not hint at or suggest any inclusion or specific recitation of antimony and/or copper in the composition of the “tin alloy”.

In addition, one having ordinary skill in the art would still not look to Takeshita for the present invention, since Takeshita never mentions or suggests the technical problem or a solution to the technical problem solved by the present invention and concerning the improvement of the audio and video electrical signals conduction in terms of higher quality and lower distortion.

Therefore, the present invention is non-obvious and has an inventive step over Takeshita, and so is patentable over Takeshita.

The Shockley reference does not cure the deficiencies of Takeshita, since Shockley discloses a method for “electrodeposition of tin - antimony - copper alloys”. Shockley starts from a known alloy containing Sn, Sb and Cu and discloses an electrodeposition method to plate bearing surfaces and babbitt metal. One skilled in the art would recognize that babbitt metal, also called “white metal”, is a well-known alloy used to provide the bearing surface in a plain bearing, containing Sn - Cu, Sn - Sb - Cu, or Sn - Sb - Pb.

One having ordinary skill in the art would recognize that Takeshita and Shockley cannot be properly combined, since Shockley does not disclose or suggest substituting any materials such as antimony or copper for the required gallium in the tin alloy of Takeshita.

Shockley merely discloses and claims an electrodeposition method to be used for plating metals with a known alloy of Sn - Sb - Cu. To obtain this alloy deposition, Shockley makes use of fluoborate salts of the metals employed, fluoborate of tin, of antimony, and of copper, as recited in Shockley, column 1, line 40. This is due to the fact that Shockley is looking for a suitable method for plating babbitts and other types of bearing surfaces, and the goal is to achieve good performances in terms of resistance to physical and mechanical stress. Shockley does not use pure metals, as in the present invention, but instead Shockley uses salts of metals, and the result in Shockley is different both in physical and electrical terms with respect to the case where pure metals are employed, as in the present invention.

If the wire or method for making a wire of the present invention would hypothetically employ the wire according to Shockley, or if the wire or method for making a wire of the present invention would use the metal salts used by Shockley in a dipping bath, the maker of the wire of the present invention and the resultant wire formed thereof according to the present invention would never solve the technical problem which the present invention is aiming to solve, which is to improve the audio and video electrical signals conduction in terms of higher quality and lower distortion.

In fact, the present invention discloses a wire made of a copper core and an outer layer made of an alloy of Sn - Sb - Cu, in which the Sn - Sb - Cu coating is made through dipping in a bath of molten alloy in order to obtain much greater thickness of the coating, which may be, for example, at least 100 micrometers, and a crystalline structure of the coating itself which is apt to

attain the surprising effect of improving the audio and video electrical signals conduction in terms of higher quality and lower distortion.

One skilled in the art could not learn anything from the Shockley reference, since no thick coating consisting of Sn - Sb - Cu is disclosed in Shockley, and no bath of molten Sn - Sb - Cu alloy is disclosed in Shockley, as required by the present invention. No surprising effect of improving the audio and video electrical signals conduction in terms of higher quality and lower distortion is mentioned in or suggested by Shockley as well.

One skilled in the art also could not learn anything from the Takeshita reference either, because the method of Takeshita disclosed on FIG. 2 and on page 1, column 2 includes: annealing with temperatures of 500° of the copper wire; acid pickling; water washing; pre-heating at 500° in nitrogen gas to prevent oxidation; and hot dipping.

The present invention does not employ and does not need any annealing which would change the physical characteristic of the copper wire, and the present invention does not employ any of acid pickling, water washing, or pre-heating at 500°. No teaching or suggestion is present in the Takeshita reference for one having ordinary skill in the art to develop the wire and fabrication method of such a wire as in the present invention.

Accordingly, claims 1-3, 7-12, and 14-22 are patentable over the cited art, so reconsideration and withdrawal of the rejection of claims 1-3, 7-12, and 14-22 are respectfully requested.

Entry and approval of the present amendment and allowance of all pending claims are respectfully requested.

In case of any deficiencies in fees by the filing of the present amendment, the Commissioner is hereby authorized to charge such deficiencies in fees to Deposit Account Number 01-0035.

Respectfully submitted,

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